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WHAT IS CLAIMED IS:

1. A polyurethane film comprising a film prepared from a polyurethane dispersion, the dispersion being prepared from a non-ionic polyurethane prepolymer, and the prepolymer being prepared from a polyurethane  
5 prepolymer formulation including a diisocyanate and an active hydrogen containing material wherein:

the dispersion is formed in a two or more step process wherein,

(1) in a first step the prepolymer is formed and, in a subsequent step,

- 10 (2) an aqueous dispersion of the prepolymer is formed, in the presence of an anionic surfactant, both steps occurring in the substantial absence of an organic solvent.

2. The polyurethane film according to Claim 1, wherein the diisocyanate is either:

15 (a) an aliphatic diisocyanate; or

(b) an aromatic diisocyanate selected from the group consisting of MDI, TDI, and mixtures thereof.

3. The polyurethane film according to Claim 1, wherein the active hydrogen containing material is either:

20 (a) a mixture of a high molecular weight diol and a low molecular weight diol; or

(b) a high molecular weight diol, wherein when the active hydrogen containing material does not include a low molecular weight diol, the prepolymer is dispersed in water which includes a difunctional amine chain extender.  
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4. The polyurethane film according to Claim 3 wherein the high molecular weight diol is a high molecular weight poloxypropylene diol having an ethylene oxide capping of from 0 to 25 percent.

- 5        The polyurethane film according to Claim 1 wherein the anionic surfactant is sodium dodecyl benzene sulfonate.
6.       The polyurethane film according to Claim 1 wherein the dispersion has a particle size of from 0.9 microns to 0.05 microns.
- 5    7.       The polyurethane film according to Claim 1 wherein the dispersion has a solids content of from 5 to 60 weight percent.
8.       The film of Claim 1, wherein the film has a shape of a glove, a condom, an angioplasty balloon, a medical bag or a catheter.
9.       A process for preparing a polyurethane film comprising the steps of:
- 10       of:
- (a) preparing a non-ionic polyurethane prepolymer;
- (b) dispersing the prepolymer in water in the presence of an anionic surfactant; and then
- (c) applying the dispersion to a substrate as a film;
- 15       wherein the prepolymer is prepared from a polyurethane prepolymer formulation including a diisocyanate and an active hydrogen containing material; and
- wherein steps (a) and (b) both occur in the substantial absence of an organic solvent.
- 20    10.       The process according to Claim 9, wherein
- the diisocyanate is either:
- (a) an aliphatic diisocyanate; or
- (b) an aromatic diisocyanate selected from the group consisting of MDI, TDI, and mixtures thereof; and
- 25       the active hydrogen containing material is either:

(a) a mixture of a high molecular weight diol and a low molecular weight diol; or

(b) a high molecular weight diol;

5 wherein when the active hydrogen containing material does not include a low molecular weight diol, the prepolymer is dispersed in water which includes a difunctional amine chain extender.

11. The process according to Claim 9 wherein step (c) comprises dipping, thermal coagulation, casting, electrodeposition, or a combination thereof.

10 12. The process of Claim 9 wherein the shape of the substrate is such that the resulting film is in the shape of a glove, condom, angioplasty balloon, medical bag, medical tubing, or catheter.

13. An aqueous polyurethane dispersion useful for preparing polyurethane films comprising the product of dispersing in water a  
15 nonionic polyurethane prepolymer prepared from a prepolymer formulation including a diisocyanate and a mixture of diols wherein:

the dispersion is formed in a two or more step process wherein,

(1) in a first step the prepolymer is formed and, in a subsequent step,

20 (2) an aqueous dispersion of the prepolymer is formed, in the presence of an anionic surfactant, both steps occurring in the substantial absence of an organic solvent.

14. The dispersion of Claim 13, wherein the diisocyanate is either:

(a) an aliphatic diisocyanate; or

25 (b) an aromatic diisocyanate selected from the group consisting of MDI, TDI, and mixtures thereof.

15. The dispersion of Claim 13, wherein the mixture of diols is a mixture of a high molecular weight diol and a low molecular weight diol.

16 The dispersion of Claim 15 wherein the high molecular weight diol is a polyoxypropylene diol with an ethylene oxide capping of from 0 to 25 percent.

17. The dispersion of Claim 13, wherein the dispersion has a particle size of from 0.9 microns to 0.05 microns.

18. The dispersion of Claim 13 wherein the dispersion has a solids content of from 5 to 60 weight percent.

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